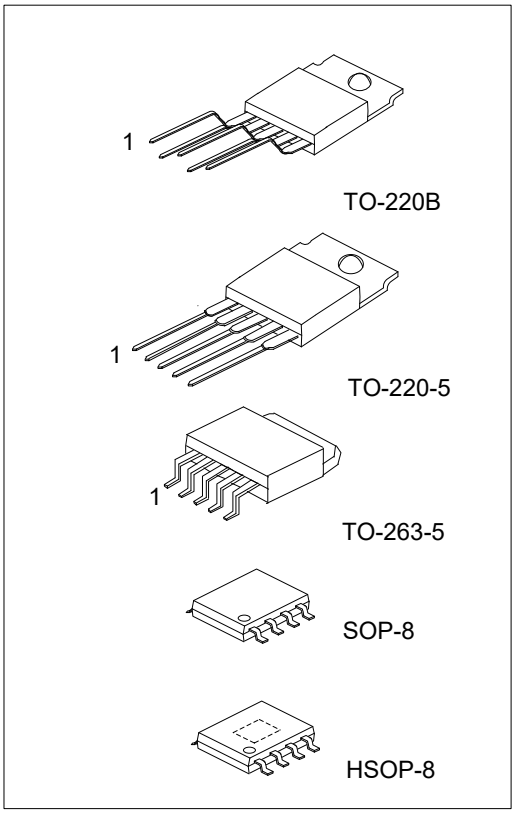
P2576/A/HV

LINEAR INTEGRATED CIRCUIT

3A STEP-DOWN VOLTAGE SWITCHING REGULATOR



■ DESCRIPTION

As a step-down (buck) switching regulator, the UTC **P2576/A/HV** provides drives 3A load. The UTC **P2576/A/HV** are simple because it only needs to use a minimum number of external components.

Frequency compensation and a fixes-frequency oscillator are in it. UTC **P2576/A/HV** can perform with standard inductors, and simplifying the switch mode power supplies' design. UTC **P2576/A/HV** guarantees output load conditions and ±10% on the oscillator frequency. Its external shutdown is included with 50μA standby current. As well as thermal shutdown for full protection under fault conditions, the output switch has cycle by cycle current limiting.

■ FEATURES

* Output Current 3A
* Input Voltage Range of 7V to 40V for P2576 / P2576A and 7V to 60V for P2576HV
* Requires 4 External Components
* Very High Efficiency
* TTL Shutdown
* Low Power Standby Mode
* Thermal Shutdown
* Current Limit Protection
* Internal Oscillator: 52 kHz Fixed Frequency

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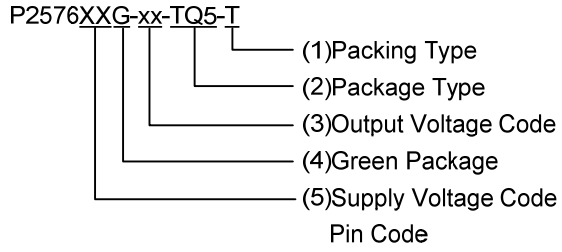
■ ORDERING INFORMATION

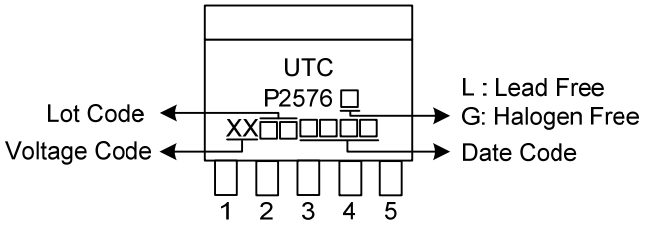
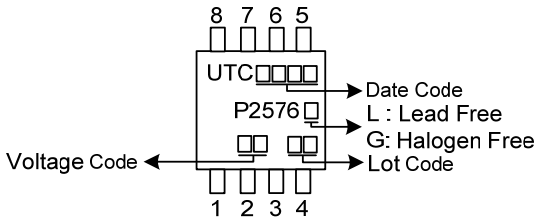
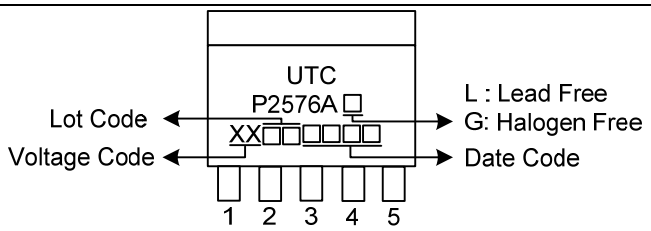
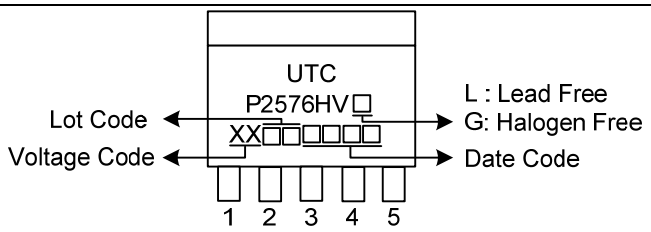
Ordering Number		Package	Packing
Lead Free	Halogen Free		
P2576L-xx-TA5-T	P2576G-xx-TA5-T	TO-220-5	Tube
P2576L-xx-TB5-T	P2576G-xx-TB5-T	TO-220B	Tube
P2576L-xx-TQ5-R	P2576G-xx-TQ5-R	TO-263-5	Tape Reel
P2576L-xx-TQ5-T	P2576G-xx-TQ5-T	TO-263-5	Tube
P2576L-xx-S08-R	P2576G-xx-S08-R	SOP-8	Tape Reel
P2576L-xx-SH2-R	P2576G-xx-SH2-R	HSOP-8	Tape Reel
P2576AL-xx-TQ5-R	P2576AG-xx-TQ5-R	TO-263-5	Tape Reel
P2576AL-xx-TQ5-T	P2576AG-xx-TQ5-T	TO-263-5	Tube
P2576HVL-xx-TQ5-R	P2576HVG-xx-TQ5-R	TO-263-5	Tape Reel
P2576HVL-xx-TQ5-T	P2576HVG-xx-TQ5-T	TO-263-5	Tube

Note: xx: Output Voltage, refer to Marking Information.

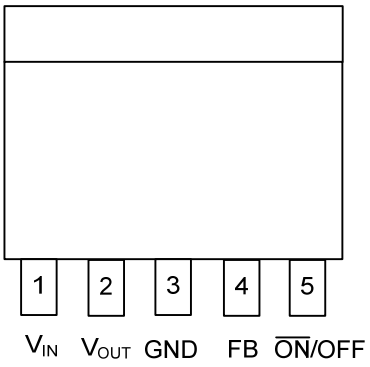


(1) T: Tube, R: Tape Reel
(2) TA5: TO-220-5, TB5: TO-220B, TQ5: TO-263-5
S08: SOP-8, SH2: HSOP-8
(3) xx: refer to MARKING INFORMATION
(4) G: Halogen Free and Lead Free, L: Lead Free
(5) Blank: 40V, HV: 60V
A: refer to PIN CONFIGURATION

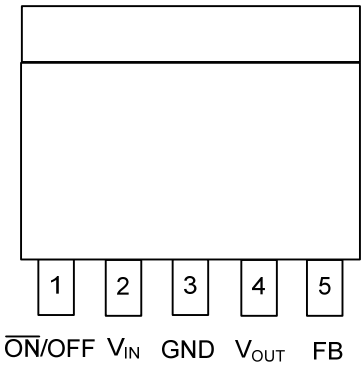
■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
P2576		
TO-220B TO-220-5 TO-263-5	50:5.0V 33:3.3V 12:12V 15:15V AD:ADJ	
SOP-8 HSOP-8		
P2576A		
TO-263-5	50:5.0V 33:3.3V 12:12V 15:15V AD:ADJ	
P2576HV		
TO-263-5	50:5.0V 33:3.3V 12:12V 15:15V AD:ADJ	

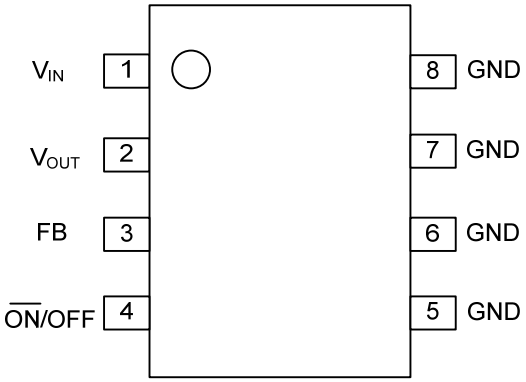
■ PIN CONFIGURATION



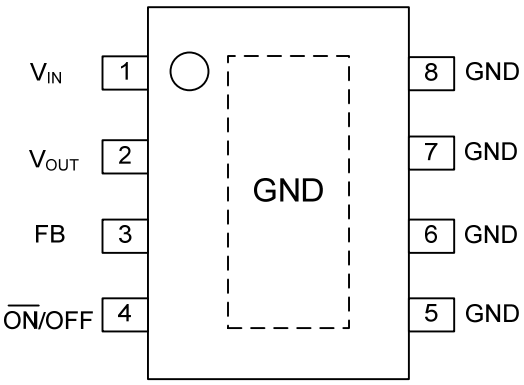
P2576/HV
TO-220B/TO-220-5/TO-263-5



P2576A
TO-263-5



P2576/HV
SOP-8



P2576/HV
HSOP-8

■ PIN DESCRIPTIONS

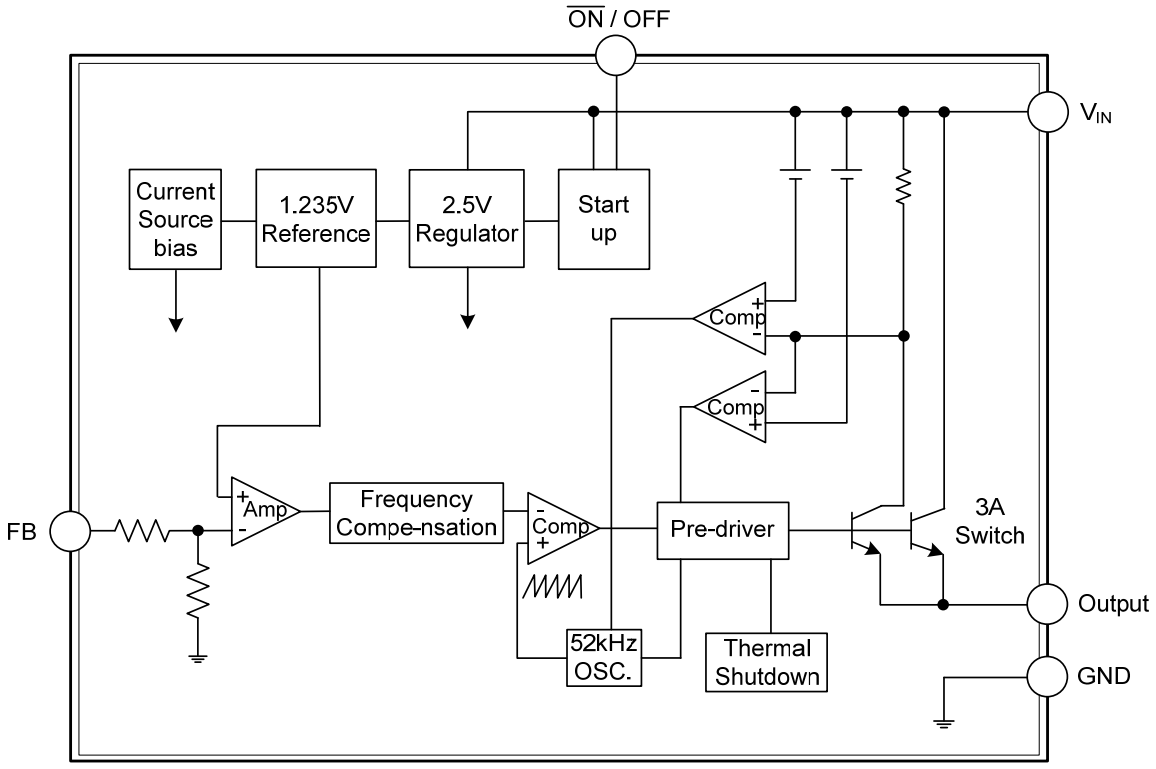
For P2576/A/HV TO-220B/TO-220-5/TO-263-5

PIN NO.		PIN NAME	PIN DESCRIPTION
P2576/HV TO-220B TO-220-5 TO-263-5	**P2576A** TO-263-5		
1	2	V_{IN}	Input voltage
2	4	V_{OUT}	Output voltage
3	3	GND	Ground
4	5	FB	Feed back
5	1	$\overline{ON}$ / OFF	$\overline{ON}$ / OFF select pin, when connected to the ground the chip in operating normally $\overline{ON}$ / OFF pin can't floating

For P2576/HV SOP-8/HSOP-8

PIN NO.	PIN NAME	PIN DESCRIPTION
1	V_{IN}	Input voltage
2	V_{OUT}	Output voltage
3	FB	Feed back.
4	$\overline{ON}$ / OFF	$\overline{ON}$ / OFF select pin, when connected to the ground the chip in operating normally. $\overline{ON}$ / OFF pin can't floating.
5,6,7,8	GND	Ground

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNITS
Supply Voltage	P2576 P2576A	V_{CC}	40	V
	P2576HV		60	V
Maximum Supply Voltage	P2576 P2576A	$V_{CC(MAX)}$	45	V
	P2576HV		65	V
$\overline{ON}$/OFF Pin Input Voltage		$V_{ON/OFF}$	-0.3 ~ V_{IN}	V
Output Voltage to Ground (Steady State)		V_{OUT}	-1.0	V
Power Dissipation		P_D	Internally Limited	mW
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40 ~ +125	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220B TO-220-5	θ_{JA}	45	°C/W
	TO-263-5		55	°C/W
Junction to Case	TO-220B TO-220-5	θ_{JC}	3	°C/W
	TO-263-5		4	°C/W

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

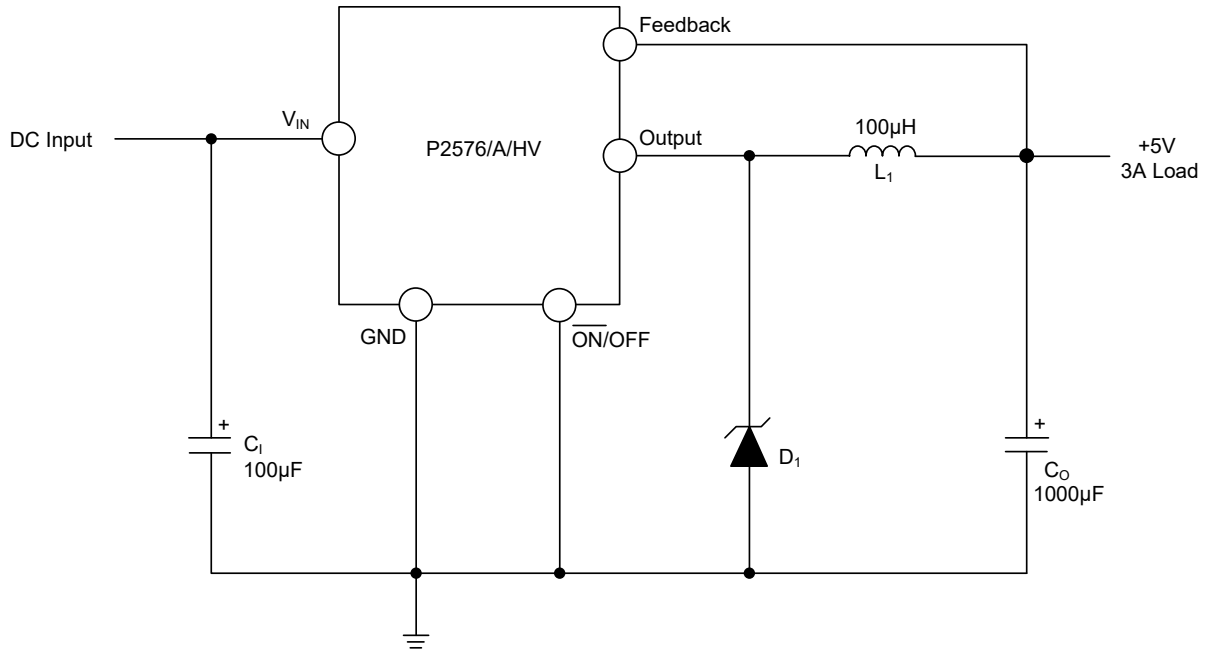
■ ELECTRICAL CHARACTERISTICS

(T_J=25°C, When V_{OUT} = 3.3V & 5V & ADJ, V_{IN} = 12V；V_{OUT} = 12V, V_{IN} = 15V，V_{OUT} = 15V, V_{IN} = 18V, I_{LOAD}=500mA, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Feedback Voltage	3.3V	V_{OUT}	7V≤V_{IN}≤40V, 0.5A≤I_{LOAD}≤3A	3.17	3.3	3.43	V
	5.0V		8V≤V_{IN}≤40V, 0.5A≤I_{LOAD}≤3A	4.8	5.0	5.2	V
	12V		15V≤V_{IN}≤40V, 0.5A≤I_{LOAD}≤3A	11.52	12.0	12.48	V
	15V		18V≤V_{IN}≤40V, 0.5A≤I_{LOAD}≤3A	14.4	15	15.6	V
Efficiency	3.3V	η	V_{IN}=9V, I_{LOAD}=3A		70		%
	5.0V		V_{IN}=12V, I_{LOAD}=3A		77		%
	12V		V_{IN}=15V, I_{LOAD}=3A		88		%
	15V		V_{IN}=18V, I_{LOAD}=3A		88		%
P2576/A/HV - ADJ							
Feedback Voltage		V_{FB}	V_{IN}=12V, I_{LOAD}=0.5A, V_{OUT} =5V	1.180	1.23	1.279	V
			8V≤V_{IN}≤40V, 0.5A≤I_{LOAD}≤3.0A, V_{OUT} =5V	1.180	1.23	1.279	V
Efficiency		η	V_{IN} = 12 V, I_{LOAD} =3.0 A, V_{OUT} =5V		77		%
ALL OUTPUT VOLTAGE							
Oscillator Frequency		f_{OSC}	(Note 4)	42	52	63	kHz
Saturation Voltage		V_{SAT}	I_{OUT}=3A (Note 1)		1.4	1.8	V
Max Duty Cycle (ON)		DC	(Note 2)	93	98		%
Current Limit		I_{LIMIT}	(Note 1, 4)	3.5	5.8	6.9	A
Output Leakage Current		$I_{I(LEAK)}$	V_{IN}=40V, Output=-0.95V (Notes 3)			30	mA
			Output=0V			200	μA
Quiescent Current		IQ	(Note 3)		5	10	mA
Standby Quiescent Current		I_{STBY}	$\overline{ON}$/OFF Pin=5V (OFF)		50	200	μA
ON/OFF Pin Logic Input Level		V_{IH}	V_{OUT}=0V	2.2			V
		V_{IL}	V_{OUT}=Nominal Output Voltage			1.0	V
ON/OFF Pin Input Current		I_{IH}	$\overline{ON}$/OFF Pin=5V (OFF)		12	30	μA
		I_{IL}	$\overline{ON}$/OFF Pin=0V (ON)		0	10	μA

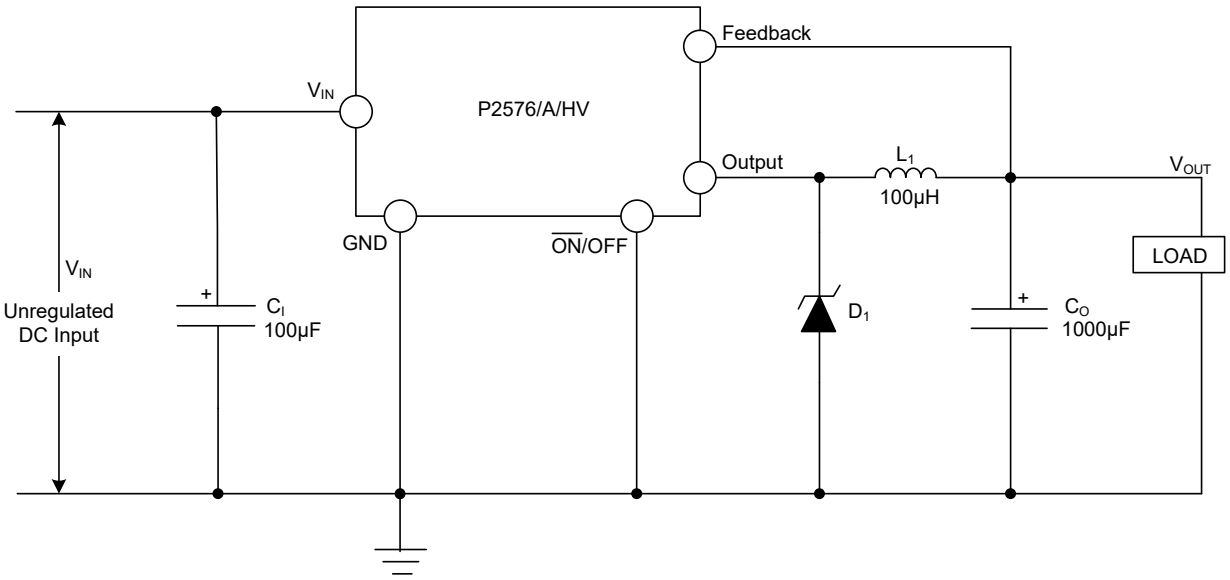
Notes: 1. Output pin sourcing current. No diode, inductor or capacitor connected to output.
2. Feedback pin removed from output and connected to 0V.
3. Feedback pin removed from output and connected to +12V, to force the output transistor OFF.
4. The oscillator frequency reduces to approximately 11 kHz in the event of an output short or an overload which causes the regulated output voltage to drop approximately 40% from the nominal output voltage. This self- protection feature lowers the Average power dissipation of **P2576/A/HV** by lowering the minimum duty cycle from 5% down to approximately 2%.

■ APPLICATION CIRCUIT



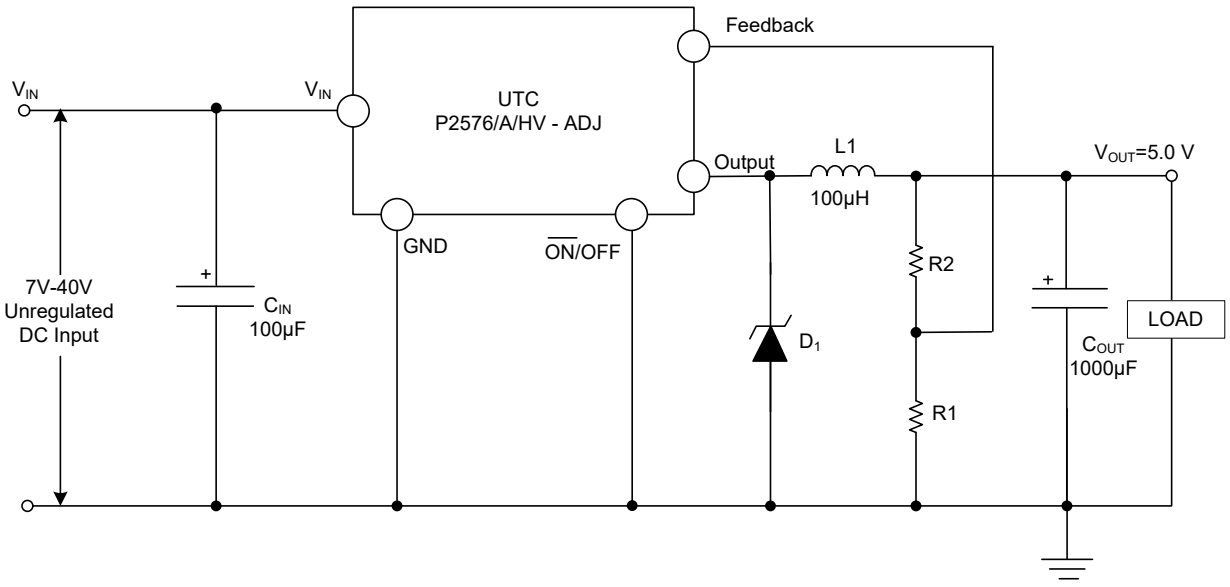
■ TYPICAL TEST CIRCUIT

Fixed Output Voltage Versions



C_I : 100μF, 75V
C_O : 1000μF, 25V
D_1 : Schottky
L_1 : 100μH
R_1 : 2K, 0.1%
R_2 : 6.12K, 0.1%

Adjustable Output Voltage Versions

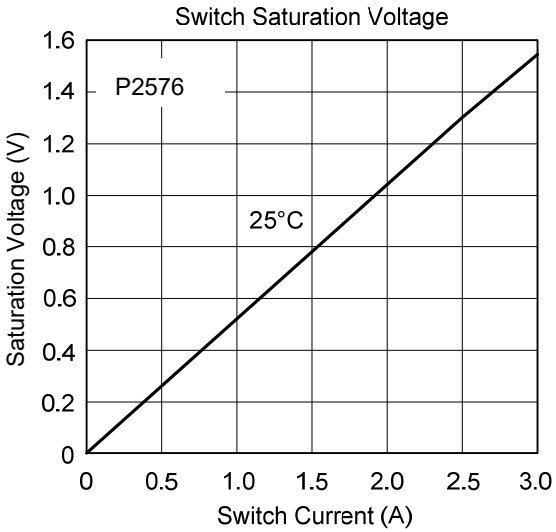


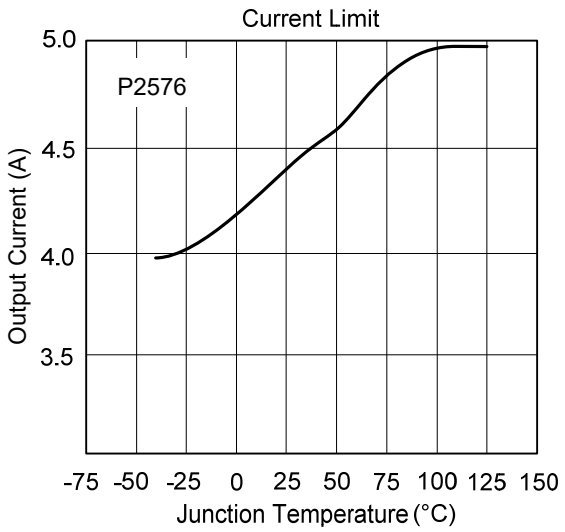
Note: $V_{OUT} = V_{REF}(1+\frac{R_2}{R_1})$

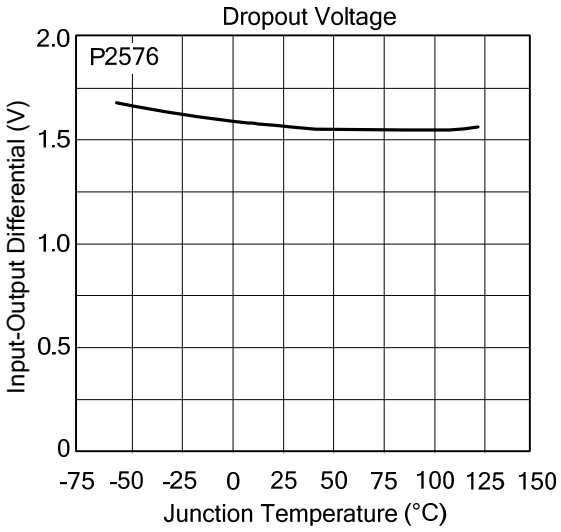
$R_2 = R_1(\frac{V_{OUT}}{V_{REF}} - 1)$

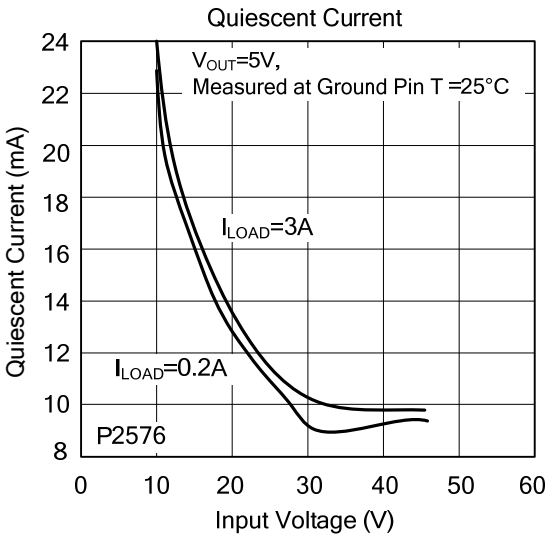
(Where V_{REF}=1.23V, R1 between 1k and 5k.)

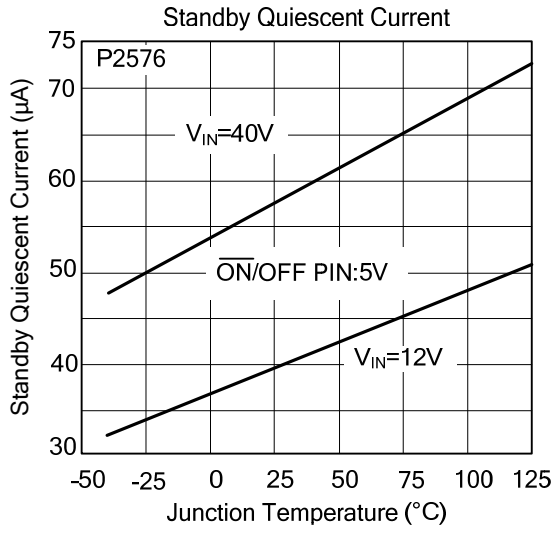
■ TYPICAL APPLICATION CIRCUIT (T_A=25°C, V_{CC}=12V, unless otherwise specified)

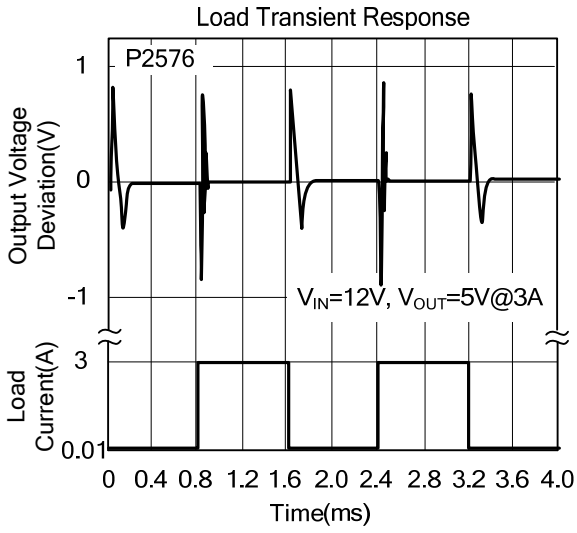




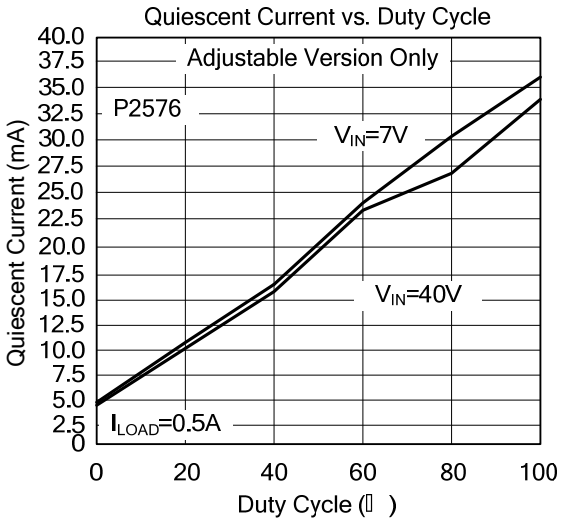


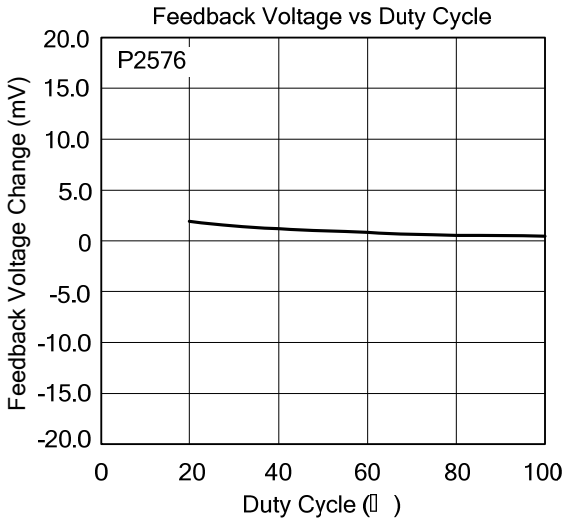


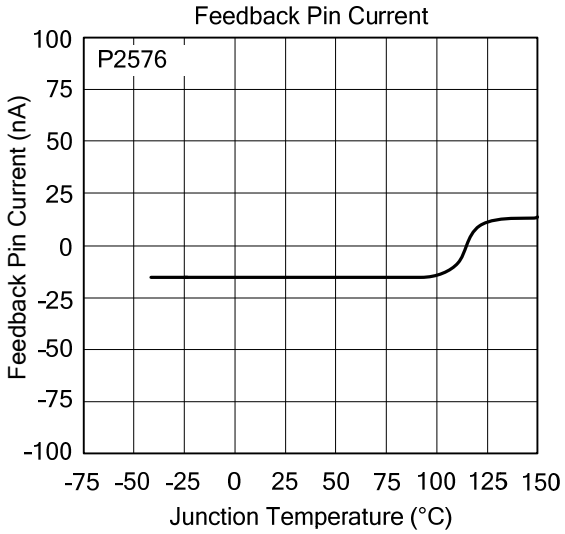


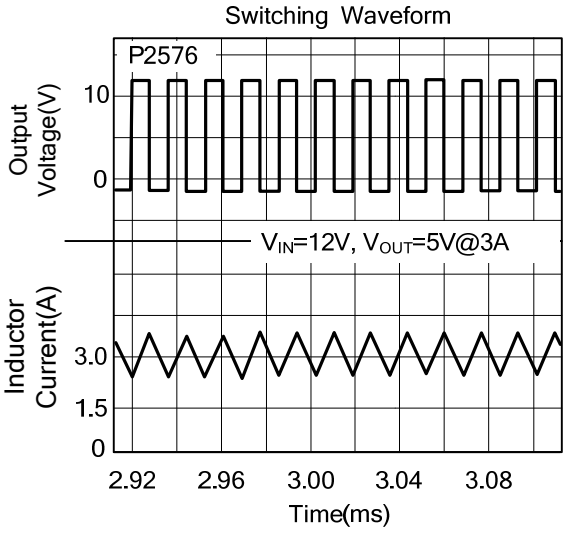


■ TYPICAL APPLICATION CIRCUIT (Cont.)









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